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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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07/25/2001

James M. Tour

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08/21/2008

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EXAMINER

SKIBINSKY, ANNA

ART UNIT

PAPER NUMBER

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 09/912,923	<b>Applicant(s)</b> TOUR ET AL.	
	<b>Examiner</b> ANNA SKIBINSKY	<b>Art Unit</b> 1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 58-76 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 58-76 is/are rejected.
- 7) ☒ Claim(s) 59-76 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

The instant Application has been revived for examination after abandonment on 5/18/2006.

### **REQUEST FOR CONTINUED EXAMINATION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/15/2008 has been entered.

Applicants' arguments, filed 5/15/2008, have been fully considered but they are not deemed persuasive. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

New claims 58-76 are acknowledged. Claims 1-57 have been cancelled.

### ***Priority***

1. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Priority of US application 60/220,790 filed 7/25/2000 is acknowledged. Priority is given on the basis that

60/220,790 discloses providing a self-assembled nanocell comprising an input lead, output lead and a random nano-network, programming the nano-cell, and configuring the molecular circuit components of the nano-cell.

### ***Claim Objections***

2. Claims 59-76 are objected to because of the following informalities: The instant claims depend from cancelled claims 1 and 6, e.g. see claim 59 which recites "according to claim 1" and claim 67 which recites "according to claim 6". For the purpose of examination, claims 59-76 are interpreted as all being dependent from independent claim 58. Appropriate correction is required.

### **Claim Rejections - 35 USC § 101**

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 58-76 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 58-76 are drawn to a process for making an electronic component comprising providing a self-assembled nano-cell, programming the nano-cell and configuring the molecular circuit components of the nano-cell. The process of providing, programming and configuring according the claimed method involves the application of algorithms and computations which can be carried out *in silico* on a nano-cell that is computer simulation of a physical nano-cell and, therefore, involves the application of a

Art Unit: 1631

judicial exception. Regarding inventions involving the application of a judicial exception, said application must be a practical application of the judicial exception that includes either a step of a physical transformation, or produces a useful, concrete, and tangible result (State Street Bank & Trust Co. v. Signature Financial Group Inc. CAFC 47 USPQ2d 1596 (1998), AT&T Corp. v. Excel Communications Inc. (CAFC 50 USPQ2d 1447 (1999))). In the instant claims, there is no step of physical transformation, thus the instant claims must recite a practical application; i.e. recite a useful, concrete, and tangible result. See MPEP 2106, in particular, Section IV, for an explanation of a concrete, tangible and useful result.

Claims 58-76 do not recite a tangible result. Though the claims recite "providing a nano-cell", the nano-cell may be one modeled with a computer simulation as demonstrated by Applicants in the disclosure. The instant claims therefor have a non-statutory embodiment without a tangible result or a physical transformation. A tangible result requires that the claim must set forth a practical application to produce a real-world result. Examples of a "real-world result" include a physical transformation of matter, or a step of communicating the result in a TANGIBLE format to a user; e.g. by outputting or displaying the result of the method. Applicant is reminded that any amendment must be fully supported and enabled by the originally filed description.

As the claims do not recite a physical transformation of matter OR a concrete, tangible and useful result, they are not directed to statutory subject matter.

***Claim Rejections - 35 USC § 112-2<sup>nd</sup> paragraph***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 61 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 61 recites the limitation "according to claim 60 wherein said providing comprises". There is insufficient antecedent basis for this limitation in the claim because claim 60 does not recite "providing" and though claim 60 depends from claim 59 which depends from 58, the "providing" in claim 58 recites "providing a nano-cell". Claim 58 does not recite providing a molecular switch or any recitation of a molecular switch.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

Art Unit: 1631

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 58-59 and 61-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andres et al. in view of Tour et al.

7. Andres et al. teach a self assembled nanostructure, as a basis for nano-electric digital circuits. The nanostructure is a self-assembly of single crystal metal clusters (i.e. random nano-network) arranged in a rigid superlattice (Abstract and page 1323, col. 1, ¶1-2). (i.e. nanocell). As shown in Figure 1 (page 1323), the nanoparticles have a functionality of electrical connectors that form molecular circuit components into a conductive network (page 1324, col. 2, ¶4), as in claim 58, step (a).

8. Andres et al. teach applying a voltage across the nano-network wherein each junction of the nanocell has a capacitance resistance and tunneling rate and the bias voltage is adjusted in a "Coulomb staircase" behavior (page 1324, col. 2, ¶4 to col. 3, ¶3 and Figure 4), as required in claim 58, step (b1).

9. Andres et al. teach a superlattice (page 1323, col. 1, ¶1-2) of nanoparticles (i.e. a random array), as in claim 74, (a1) where in the Au clusters is interconnected by being covalently bonded with the self-assembled monolayer (i.e. also interconnect due to chain disorder) (page 1323, col. 1, ¶2), as in claim 74, step (a1) and (a2).

Art Unit: 1631

10. Andres et al. teach a film thickness of 0.83 nm (page 1323, col. 3, ¶3), as in claim 76.

11. Andres et al. teaches testing the performance of a nanocell (e.g. Figure 2), as in claims 66 and 69, step (b2),

12. Andres et al. does not teach an input lead and an output lead as recited in claim 58, step (a) or wherein the voltage is applied across the input and output lead. Andres et al. does not teach alligator clips as in claim 74, step (a3).

**13.** Tour et al. however teach molecular devices configured to behave as electronic devices (Abstract). Tour et al. teach and input and output current (page 8487, col. 1, ¶3) and voltage in and voltage out (page 8487, col. 2, ¶2) and input and output gates (page 8488, col. 2, ¶2) (i.e. input and output leads), as required in claim 58, step (a) and (b1). In another embodiment of claim 58, Tour et al. also teach a random nano-network of molecular circuit components and making adjustment of a conductivity affecting property of the molecular circuit components in that the electron density is reshaped due to the input signals (page 8488, col. 1, ¶2). Tour et al. teach possibility of self-assembly of the molecular circuit elements (page 8493, col.2, ¶2).

**14.** Tour et al. teach molecular switches (Abstract and page 8486, col. 1, ¶1), as in claim 59 and resonant tunneling diodes (Abstract and page 8487, col. 1, ¶2), as in claim 62.

**15.** Tour et al. teach switches connected to input and output lead for receiving signals (page 8487, col. 1, ¶2, mid-paragraph), as in claim 61.



Art Unit: 1631

16. Tour et al. teach regions on the molecules with negative electrostatic potential (page 8493, col. 1, ¶3), as in claim 63.
17. Tour et al. teach conjugated molecules (Abstract and page 8489, col. 1, ¶2), as in claim 64.
18. Tour et al. teach electron density is reshaped due to the input signals (page 8488, col. 1, ¶2) (i.e. conformational state), as in claim 65.
19. Tour et al. teach a self-adaptive learning algorithm wherein in the input potential applied is such that that molecular potential barrier is above a threshold, the electron density will be reshaped (page 8490, col. 1, ¶ 2 to page 8491, col. 1, ¶ 1), as in claims 67, 68, 69, step (b3)
20. Tour et al. teach a logic unit that is a bit adder (page 8486, col. 2, ¶2) and AND,OR, NOR, NAND (page 8490, Figure 5), as in claims 70 and 72.
21. Tour et al. teach logic tables (i.e. truth tables) (page 8490, col. 2, Figure 5), as in claim 71.
22. Tour et al. teach a memory and a CPU (page 8487, col. 1, ¶1), as in claim 73.
23. Tour et al. teach alligator chips (page 8489, col. 2, ¶1), as in claim 74, step (a3).
24. Tour et al. teach alligator clips selected from thiol moieties (page 8489, col. 2, ¶1), as in claim 75.
25. It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have implemented the method of making a cell shaped molecular device (i.e. a nanocell) from self-assembled nanoparticles as taught by Andres et al. the method of connecting the nanocell with an input and output lead for

Art Unit: 1631

transmitting a current as taught by Tour et al. One of skill in the art would have been motivated to use the method as taught by Andres et al. with that of Tour et al. because Tour et al. teach the usefulness of molecular devices as components of computational devices (page 8486, col. 1, ¶1) and the use of self-assembling particles (page 8593, col. 2, ¶2). One of skill in the art would have had a reasonable expectation of success at utilizing the method of Andres et al. with that of Tour et al. because both teach organizing molecules to be used as electronic components.

### ***Conclusion***

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Skibinsky whose telephone number is (571) 272-4373. The examiner can normally be reached on 8 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on (571) 272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1631

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anna Skibinsky, PhD

/Lori A. Clow, Ph.D./

Primary Examiner, Art Unit 1631